2231

BREWSTER ANGLE MICROSCOPY

KAERCHER T.[1], MÖBIUS D.[2], WELT R.[1], HÖNIG D.[2]
[1] Augenklinik Ludwigshafen (Germany)
[2] Max-Planck-Institut für Biophysikalische Chemie, Göttingen (Germany)

Purpose: The established methods for observing the morphology of the tear film are based on interference techniques. Since interference patterns are visible only in a pathologically thickened tear film, these techniques are not useful for the physiological tear film morphology.
Methods: A new approach is Brewster Angle Microscopy (BAM), which allows the study of ultra-thin films. In ophthalmology it is applied for the in vitro observation of spread Meibomian gland secretion. When p-polarized He-Ne-laserlight is incident at an interface of two refracting media (n_1,n_2), no visible light is reflected if the angle of incidence is the Brewster angle. The Brewster angle for an air-water-interface is 53.1°. If a layer of amphiphilic molecules (e.g. Meibomian gland secretion) is spread on a water subphase, light is reflected that can be used to image the spread lipid layer.
Results: Non-pathological Meibomian gland secretion forms homogeneous films including phases of higher and lower reflectivity. The mobility of these phases varies according to the compression of the films. The secretion is characterized by a rapid spreading after touching the water surface.
Conclusion: The BAM technique allows new insights on Meibomian lipid films in vitro. Using isotropic Fresnel formulae the thickness of different phases of the films can be determined.

2232

TITLE: AGAROSE GEL ELECTROPHORESIS OF HUMAN TEARS: NO POLYMERIC MUCIN DETECTED.

PANDIT J.C. TIFFANY J.M. and **BRON A.J.**
Nuffield Laboratory of Ophthalmology, University of Oxford (UK)

Purpose It has long been assumed that polymeric conjunctival mucins are dissolved in the aqueous component of the precorneal tear film and are responsible for the viscoelastic properties of tears observed in vitro. This study investigated whether polymeric mucins could be detected in unstimulated tears.
Methods Unstimulated tear samples (0.5-5µl) were collected from the inferior meniscus of healthy volunteers of both sexes using glass capillary tubes. These were pooled and run on agarose gel (1% w/v in Tris-Acetate-EDTA buffer) in a flat-bed apparatus together with secretory IgA, rabbit conjunctival mucin, and human conjunctival mucin as markers. The gel was vacuum-blotted onto nitrocellulose paper and stained using a biotinylated lectin (Wheat Germ Agglutinin) and then the avidin-peroxidase-substrate (Diaminobenzidine) system.
Results No polymeric mucins could be detected in the pooled unstimulated human tears. Polymeric mucins from human conjunctiva and rabbit conjunctiva did migrate on the gel and were easily detected at a concentration of 1.25mg/ml.
Conclusion Polymeric mucins may not play as large a role as has been previously thought in maintaining the stability of the aqueous component of the precorneal tear film. Other high molecular weight molecules, or their interactions, may be responsible for the rheological properties of tears in the eye.

Supported by a grant from the Wellcome Trust.

2233

TEAR SECRETION IN INSULIN-DEPENDENT DIABETICS

GOEBBELS M.
Department of Ophthalmology, University of Bonn (Germany)

Purpose. Diabetic patients often complain of dry-eye symptoms. The aim of the present study was to investigate whether diabetes mellitus is correlated with tear hyposecretion.

Methods. In 31 consecutive insulin-dependent diabetics with retinopathy (duration of diabetes > 15 years) and 32 non-diabetic controls (age- and sex-matched) both fluorophotometry of tear secretion and the Schirmer test were performed.

Results. When compared with the healthy control group diabetics showed a significant decrease in both Schirmer test readings (-32 %, $p < 0.001$) and tear flow as assessed by fluorophotometry (-43 %, $p < 0.001$).

Conclusions. Both basal tear flow and reflex tearing were found to be decreased in insulin-dependent diabetics with retinopathy. Ocular surface disease in diabetics may at least partially be caused by tear-film dysfunction.

2234

TEAR SECRETION STUDY IN FUCHS' HETEROCHROMIC IRIDOCYCLITIS

MASTROPASQUA L, CARPINETO P, LOBEFALO L, CIANCAGLINI M, DE NICOLA GC and GALLENGA PE
Institute of Ophthalmology, University "G.D'Annunzio", Chieti, Italy

Purpose: Fuchs' heterochromic iridocyclitis is a chronic uveitis of unknown origin with cataract and glaucoma as major complication. Characteristic findings of FHI are iris heterochromia, lens opacities and signs of cyclitis. Tear deficency was hypotized to be an additional feature.
Methods: In order to assess the qualitative and the quantitative tear secretion, we examined 30 white patients affected by unilateral Fuchs' heterochromic iridocyclitis. Non-affected eyes served as controls.
Results: Shirmer test, B.U.T. and ferning test showed values below the normal range in 15 out of the 30 affected eyes. In the control eyes no abnormal values were detected. The results showed a significant impairment of tear secretion in the affected eyes in comparison with the unaffected eyes ($p<0.001$).
Conclusions: The apparence of tear anomalies only in affected eyes may be linked to local immunological anomalies: autoimmunitary changes may cause an alteration of the lacrimal gland and the conjunctival muciparous cells, so inducing an impairment of tear film in a subgroup of eyes affected with Fuchs' Heterochromic Iridocyclitis.